Aura 4 Combo (2004 – 2006) Production Run Summary

Status

Available as of 3/9/2008 on the anonymous ftp site:

output/gmic/aura4

Corrections from Aura3 run

- H2 atmospheric volume mixing ratio fix from David Considine: MXRH2=0.5d-06 (reset to this value every time step)
- Condense routine fixed to use local value of ilat, not global.
- Corrected the production of ozone from shipping NOx emission.

General Model Configuration

- Years: 2004 – 2006
- 30 minute model time step

- Different restart file from Aura3 – this makes a noticeable difference in CO
- Spinup for three years (2004 3X)
- The spinup was done with a different version of lightning than in the production run. The lightning version for spinup was ap1.0 with slight modifications to the vertical profile.

- GEOS4DAS met fields
- 8 records per day
- 2 deg lat x 2.5 deg lon x 42 levels with lid at 0.01 hPa

- JPL-06 124 species with HO2 uptake reaction

- Fast_JX v5.2
- The x-section data have been revised using JPL-02, IUPAC (up to 2004) and Gierczak's acetone tables.

- Ship emissions
- Hourly NOx fossil fuel variation, provided by Aaron van Donkelaar (Dalhousie Univ.)
- Diurnal variation of biomass burning emissions: NO_bb, CO_bb, MEK_bb, PRPE_bb, C2H6_bb, C3H8_bb, ALK4_bb, ALD2_bb, and CH2O_bb
- MEGAN emissions
- Chinese seasonality of emissions from Streets
- 2004-5 GFEDv2 boreal emissions bug fix

- Ap1.2 lightning parameterization (Allen, 2007) *** see lightning section below for more details*

- 201 profile stations and the six additional ones are:
  (Bog) Bogota (74W, 4.5N; 220+ O3 profiles)
  (Rio) Rio de Janeiro (43.2W, 22.8S; 551+ O3 profiles)
  (Dak) Dakar (17.4W, 14.5N; 89+ O3 profiles
  (Dou) Douala (9.7E, 4.0N; 185+ O3 profiles)
  (Lua) Luanda (13.2E, 8.5S; 48+ O3 profiles)
  (Win) Windhoek (17.4E, 22.4S; 138 O3 profiles)

Code version

Finished testing the aura branch and trunk merge on 1/8/2008. Will use the latest version of the GMI code on the trunk. We will provide the tag in the GMI production run spreadsheet at a later date.

Output & Diagnostics

- 4 overpass times
  - 2 kinds of noon species, which really represent different satellite overpass times. Both types save CH2O, CO, NO, NO2, O3, and OH
- Overpass times: 10 – 11 am, 1 – 2 pm, midnight – 3 am, 9 pm – midnight
- Photolysis overhead ozone column in overpass files
- 3-D overhead column ozone in the overpass1&2 files
- Other overpass outputs: temperature, surface pressure, mass, grid box, relative humidity, and cloud optical depth

- Instantaneous daily constituents (freq1) "const_freq1". The constituents to be output at this frequency are: CH4, CO, HNO3, N2O, O3, OH, ClO, Cl2O2, ClONO2, HCl, CH3Cl, CFCl3, CF2Cl2
- 2-D troposphere and combo constituent column in the daily file
- Other instantaneous daily outputs: potential vorticity, tropopause pressure, temperature, surface pressure, mass, relative humidity and metwater

- 2-D total column and troposphere O3, NO2, CH2O in the column file

- Tropopause pressure in daily & all overpass files
- Grid box height in the amonthly file
- Time variable included in the station output files
- methylhydroperoxide (MP) in monthly and station files
- Hourly ozone at first eight levels
- All species in "const" in monthly averaged files

Lightning

Dale 2008 - ap1.2

Description:

- From Dale on 1/7/2008
- This modified version has an additional region for "Other North American tropics"
- Updated values for factor have been provided for GEOS4-AGCM, GEOS4-DAS, and GEOS4-FDAS.

Emissions *(Updated from Bryan on 2/14/2008)*

emisc_2004_m_2x2.5_epaNei99Reduced.nc
emisc_2005_m_2x2.5_epaNei99Reduced.nc
emisc_2006_m_2x2.5_epaNei99Reduced.nc

Description: Prasad's "fix" for the GFEDv2 biomass burning files didn't change too much. The boreal emissions increased as expected. However, emissions in other forests also changed a little bit too.

EPA/NEI99 : reduced uniformly by 22% May-September (Hudman et al.,2007)

Aerosol Dust *(Added 10/22/2007)*

aerodust_agcm_2x2.5_2004_fosFuelFromStreetskgm-3.nc
aerodust_agcm_2x2.5_2005_fosFuelFromStreetskgm-3.nc
aerodust_agcm_2x2.5_2006_fosFuelFromStreetskgm-3.nc

Description: These are from the latest run (as of 10/22/07) of GOCART (Mian Chin's model) using the most recent updated aerosol emissions (fossil fuel sources) from David Streets. These emissions are year specific.

The total emissions for 2004 are:

CH2O = 2.4 Tg C
CO = 1130 Tg
NO = 37.9 Tg N
ALK4 = 21.4 Tg C
C2H6 = 10.7 Tg C
C3H8 = 12.8 Tg C
ISOP = 427.8 Tg C
MEK = 3.1 Tg C
PRPE = 27.6 Tg C

CO_methanol = 118 Tg

CO_monoterpene = 47.7 Tg
biogenic_propene = 12.2 Tg
soil_NOx = 7.0 Tg